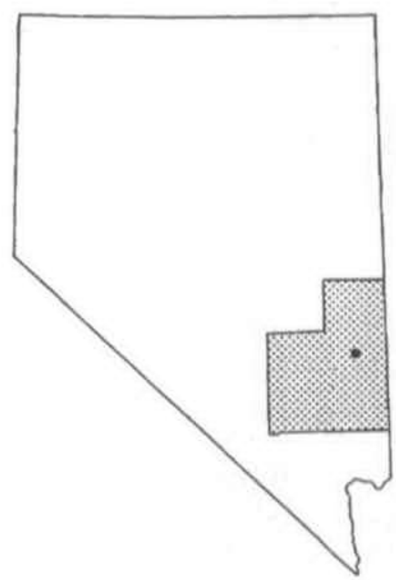
FLOOD INSURANCE STUDY

CITY OF CALIENTE, NEVADA
LINCOLN COUNTY



OCTOBER 15, 1985

Federal Emergency Management Agency

COMMUNITY NUMBER - 320015

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FLOOD INSURANCE STUDY

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study has been prepared to revise and update a previous Flood Insurance Study/Flood Insurance Rate Map for the City of Caliente, Lincoln County, Nevada. This information will be used by Caliente to update existing flood plain regulations as part of the regular program of flood insurance by the Federal Emergency Management Agency (FEMA). The information will also be used by local and regional planners to further promote sound land use and flood plain development.

In some states or communities, flood plain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the State (or other juris-dictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were performed by James M. Montgomery, Consulting Engineers, Inc. (JMM), for FEMA, under Contract No. H-4610. This study was completed in July 1980.

Hydraulic analyses for Clover Creek were revised by JMM in June 1984.

1.3 Coordination

Streams requiring detailed study were identified at an initial coordination meeting held on September 6, 1977. The meeting was attended by representatives of FEMA, the study contractor, and the city.

An intermediate coordination meeting was held on May 17, 1979, to present the community with the study results. No technical changes resulted from this meeting.

Results of the hydrologic analyses were reviewed by and coordinated with the U.S. Geological Survey, the U.S. Army Corps of Engineers, and the U.S. Soil Conservation Service; all parties were in agreement with the discharges used.

The final coordination meeting was held on June 18, 1981, and was attended by representatives of FEMA, the study contractor, and the city. All problems raised at the meeting have been resolved.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated areas of the City of Caliente, Lincoln County, Nevada. The area of study is shown on the Vicinity Map (Figure 1).

Floods caused by excessive runoff in Meadow Valley Wash, Dry Wash Runoff, Clover Creek, and Antelope Canyon Wash were studied in detail.

The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development or proposed construction through 1985.

Flooding on North Caliente Dry Wash, Denton Heights Dry Wash, and Spring Heights Dry Wash was studied by approximate methods because the individual contributing drainage areas were less than 1 square mile.

The scope and methods of study were proposed to, and agreed upon by, FEMA and the City of Caliente.

2.2 Community Description

The City of Caliente is located in eastern Lincoln County, in southeastern Nevada, in a region known as the Great Southwest Desert. The city is approximately 100 miles (155 highway miles) north of Las Vegas and approximately 110 miles south of Ely, Nevada. The city is surrounded by unincorporated areas of Lincoln County. Caliente is the only incorporated community in Lincoln County, and had a 1970 population of over 900. The projected upper limit of population for the year 1990 is 1,350, representing an increase of 50 percent over the 1970 population (Reference 1).

Caliente encompasses an area of approximately 900 acres (1970 census). Of these 900 acres, approximately 40 acres are devoted to residential use, predominantly single-family dwellings. Only 4.8 acres are used strictly for agricultural purposes. Approximately 11 acres are used for industrial purposes. Virtually all of the industrially developed property is in some way related to the railroad operations that take place within the community. Caliente serves as a commercial center for the Meadow Lake area. Commercial development in Caliente has taken place along both sides of portions of U.S. Highway 93 and along the central portion

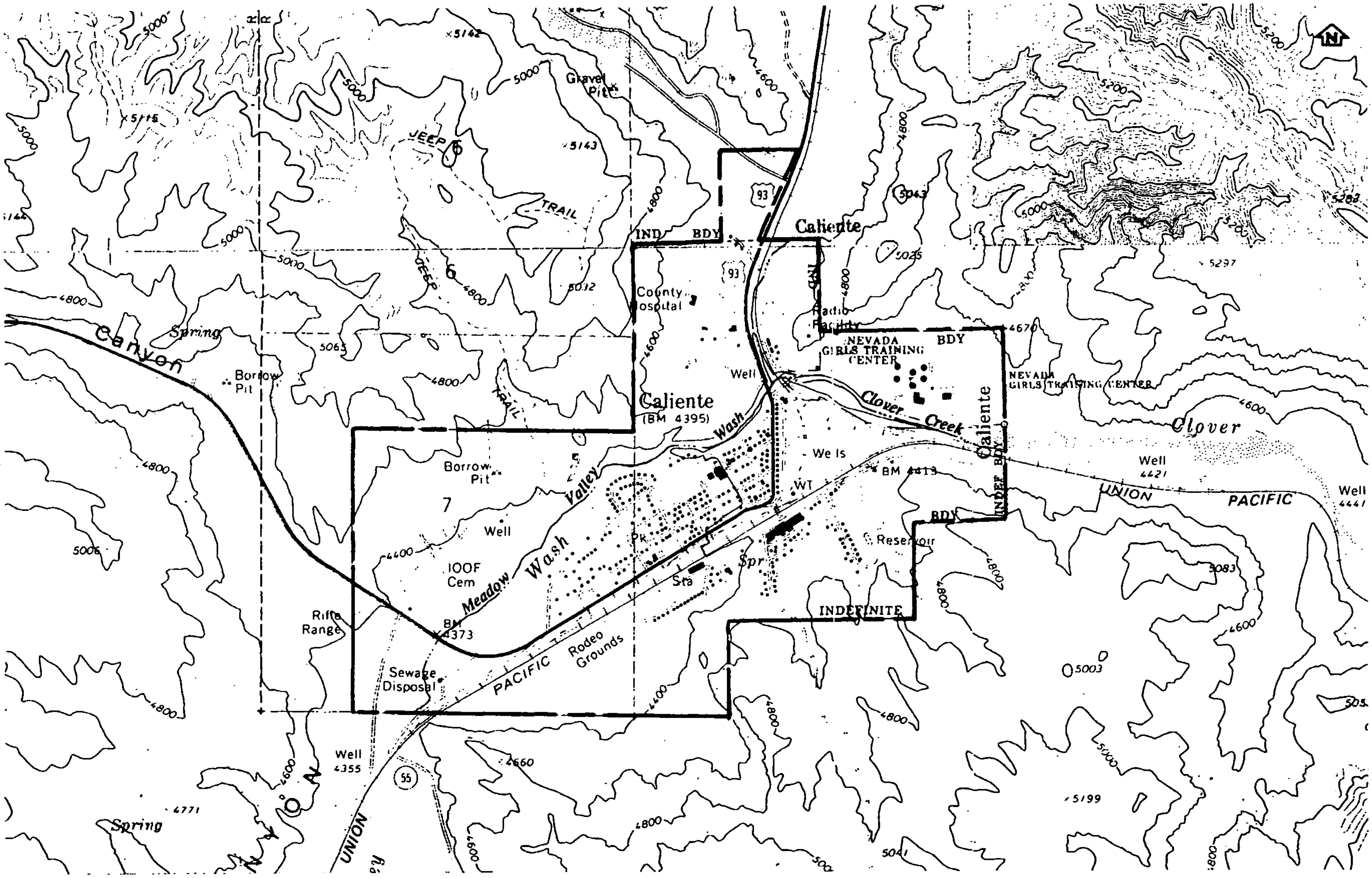

FIGURE 1	FEDERAL EMERGENCY MANAGEMENT AGENCY CITY OF CALIENTE, NV (LINCOLN CO.)	APPROXIMATE SCALE 2000 0 2000 4000 6000 FEET VICINITY MAP

of Clover Street. Over 80 percent of the land area within the corporate limits is vacant property (Reference 1).

The principal industries in Caliente are railroading, mining, and tourism (Reference 1).

Caliente is situated in the Meadow Valley Wash flood plain. Meadow Valley Wash enters the community from the north and leaves the corporate limits at the southwestern corner of the city. The drainage area at the U.S. Geological Survey stream gage site near Caliente is 1,227 square miles.

Clover Creek is a major tributary of Meadow Valley Wash; it enters the community from the east and has its confluence at the Union Pacific Railroad bridge. The Clover Creek watershed area is 258 square miles at its mouth.

Antelope Canyon Wash is a small tributary of Meadow Valley Wash that only affects flooding in the northern portion of the community. The drainage area of Antelope Canyon Wash is 41 square miles at its confluence with Meadow Valley Wash, which is located near the northern intersection of U.S. Highway 93 and the corporate limits.

Three dry washes contribute to flooding in the southeastern portion of the city. They are located southeast of the Union Pacific Railroad and east of the railroad station, and they have watershed areas of less than 1 square mile. Dry Wash Runoff is formed from the combined runoff of these three dry washes and flows parallel to the Union Pacific Railroad to its confluence with Meadow Valley Wash just south of the corporate limits.

The climate of Caliente is semiarid. Average annual precipitation is 8.7 inches (Reference 2). Most precipitation in the drainage areas results from general winter storms. The storm rainfall in winter is usually of low intensity. Storms occurring during the summer are of two types. The comparatively infrequent general summer storms cover comparatively large areas and sometimes include cells of high-intensity, short-duration rainfall. The more common local summer storms, cloudburst storms, are generally of short duration, but may result in heavy rain over a small area (Reference 3).

Soil in the area is characterized as very deep, well-drained, fine sandy loam with a gravel substratum. Vegetation consists largely of sagebrush and other hearty varieties of brush and grass that have adapted to the semiarid climate and relatively high (4,400 feet) elevation (Reference 2).

2.3 Principal Flood Problems

As noted, precipitation in the study area results from several types of storms. Flooding may result from any type of storm. General flooding usually results from winter storms, while local flooding is frequently a result of cloudburst storms.

Several major flooding events on Meadow Valley Wash have been recorded since 1910. In 1910, a flood on Meadow Valley Wash at Caliente, with an estimated discharge of 11,000 cubic feet per second (cfs) (approximately a 90-year flood event), caused considerable damage in the community. The largest historical event, with an approximate discharge of 15,000 cfs (approximately a 170-year flood event), on Meadow Valley Wash at Caliente occurred in 1938. This flood caused $298,000 (1948 dollars) worth of damage (Reference 4).

Several floods of lesser magnitude have also been observed along Meadow Valley Wash in succeeding years, including 1941, 1946, and, most recently, 1970. The 1970 flood, with a peak flow of 1200 cfs, was less than a 5-year flood.

Records of floods along tributaries to Meadow Valley Wash are scarce. Some flooding accounts for the area near Panaca, northeast of Caliente, have been published by the U.S. Soil Conservation Service (Reference 5). These accounts also detail some flooding from the mouth of Antelope Canyon Wash northwest of Caliente.

2.4 Flood Protection Measures

There are several small dams in the upper Meadow Valley Wash watershed. These include Eagle Valley Dam, Echo Canyon Dam, and Hollinger Debris Basin (Reference 6). The dams were constructed for debris control and recreational purposes and, because of their size, have little effect on peak discharges in downstream areas of the basin. Eagle Valley Dam is under the jurisdiction of the Nevada Department of Fish and Game; Echo Canyon Dam and Hollinger Debris Basin are operated by Lincoln County. Two dams designed specifically for flood control have been constructed on two tributaries to Clover Creek, east of Caliente. These are the Pine Canyon and Mathews Canyon Dams, operated by the U.S. Army Corps of Engineers, Los Angeles District (References 3 and 7). The dams reduce peak discharges with less than a 100-year recurrence interval from the two tributary streams to Clover Creek.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude which are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for flood plain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10, 2, 1, and 0.2 percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (1 percent chance of annual exceedence) in any 50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for each flooding source studied in detail affecting the community.

Where applicable, a log-Pearson Type III analysis, adjusted by historical flood estimates, was performed (Reference 8). Where a statistical approach was limited by the absence of systematic records, several regional analyses were employed to determine peak discharges.

The log-Pearson Type III analysis, as described by Bulletin 17A of the U.S. Water Resources Council (Reference 8), is a statistical method whereby systematically recorded streamflow peaks are fitted to a frequency distribution with a logarithmic transformation of data. This method is best suited to streams where long records of peak annual flows are available. The only stream in the study area with gaging records of sufficient length for this type of analysis is Meadow Valley Wash. However, because the longest period of streamflow record is less than 25 years, it was not possible to rely exclusively on the log-Pearson Type III analysis. The only gage in the study area with a substantial period (23 years) of record on Meadow Valley Wash is the U.S. Geological Survey stream gage (No. 09418500) near Caliente. In addition to the systematic record, the U.S. Army Corps of Engineers has estimated the peak discharge of nine historical flooding events near the gage. This results in a total period of historical and systematic record of 71 years. This period of record was deemed to be of sufficient length to justify the use of a historically adjusted log-Pearson Type III analysis for Meadow Valley Wash. The discharges were extended to various upstream reaches using a regional relationship developed by the U.S. Geological Survey (Reference 9).

Floodflow data are unavailable in several of the areas under study. In these areas, it was necessary to apply the method of regional analysis described in U.S. Geological Survey Water-Supply Paper 1683 (Reference 9). This method allows the computation of peak discharges based on observed trends for various hydrologic areas and geographic regions. The method, as published, is limited to drainage areas greater than 400 square miles. Thus, it is applicable only to fairly large watersheds.

The U.S. Soil Conservation Service publication, Engineering Field Manual, Notice 4, Estimating Runoff, described a method of determining peak runoff for small (i.e., less than 3.125 square miles) drainage areas (Reference 10). The tables and charts included in this publication provide a method of determining peak discharge based on topography, vegetative cover, conservation practices in effect, soil type, and precipitation. Peak discharges for Dry Wash Runoff were determined by this method.

There are two ungaged watersheds in the study area larger than 3.125 square miles but smaller than 400 square miles. The absence of gaged records made statistical analysis of peak runoff from these watersheds impossible. Therefore, it was necessary to devise a means of interpolating between the two regional methods discussed above.

The peak discharge for each of the selected recurrence intervals was computed for drainage areas of various sizes using both methods. Using the U.S. Soil Conservation Service method, discharges were computed for drainage areas between 0.1 and 3.0 square miles. The precipitation and other parameters used reflected average conditions encountered in Caliente (References 2, 5, and 11). Using the U.S. Geological Survey method, discharges were computed for drainage areas between 400 and 2,500 square miles. The discharge (in cfs) for each watershed was divided by the drainage area of that watershed (in square miles). Thus, a unit discharge value in cfs per square mile was obtained. These values were plotted on log-log paper and a smooth curve was drawn between the regions where the two methods applied. It was then possible to determine peak discharges for watersheds of intermediate size from these curves. The discharges for Antelope Canyon Wash and Clover Creek were determined in this way.

Peak discharge-drainage area relationships for Meadow Valley Wash, Dry Wash Runoff, Clover Creek, and Antelope Canyon Wash are shown in Table 1.

Table 1. Summary of Discharges

Flooding Source and Location	Drainage Area (Square Miles)	Peak Discharges (Cubic Feet per Second) 10-Year	50-Year	100-Year	500-Year
Meadow Valley Wash					
At Downstream Corporate Limits	1,526	3,214	9,073	13,088	27,481
Upstream of Clover Creek	1,268	2,889	8,157	11,766	24,704
Upstream of Antelope Canyon Wash	1,227	2,835	8,004	11,546	24,242
Dry Wash Runoff					
At Mouth	1.8	575	850	970	1,520
Clover Creek					
At Mouth	258	1,883	4,386	5,728	7,740
Antelope Canyon Wash					
At Mouth	41	1,456	3,075	4,018	5,043

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

Water-surface elevations along each of the study segments were computed for the selected recurrence intervals using the U.S. Army Corps of Engineers HEC-2 step-backwater computer program (Reference 12).

Cross section data for each stream studied in detail were developed by photogrammetric methods (Reference 13).

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway was computed (Section 4.2), selected cross section locations are also shown on the Flood Boundary and Floodway Map (Exhibit 2).

Certain areas in Caliente required special hydraulic analysis. Shallow flooding resulted from the overflow of Clover Creek at the Union Pacific Railroad near the confluence of Meadow Valley Wash, and from the overflow of Meadow Valley Wash in central Caliente. Shallow flooding from these sources affected a large portion of the developed area in Caliente. The inundated region was divided into three subareas, each identified as a zone of shallow flooding, but each having a different average depth of flooding. Flood depths ranged from less than 1 foot to 3 feet for the 100-year flood.

There were also areas of shallow flooding in northern Caliente caused by Antelope Canyon Wash overflowing its eastern levee near U.S. Highway 93 and U.S. Highway 93 north of the channel crossing. The eastern overflow follows a southerly path until it flows into Meadow Valley Wash. The overflow across the highway is contained between U.S. Highway 93 and the Union Pacific Railroad. Flood depths in the shallow flooding areas were determined by hand calculations. The average 100-year flood depth in this area of shallow flooding was 2 feet.

Flood depths for the three washes studied by approximate methods were estimated using normal depth calculations.

Roughness factors (Manning's "n") used in the hydraulic computations were chosen by engineering judgment and based on field observations of the streams and flood plain areas. Roughness values for the main channel of Meadow Valley Wash ranged from 0.042 to 0.076. Flood plain values ranged from 0.045 to 0.080. Channel roughness values for tributaries to Meadown Valley Wash ranged rom 0.040 to 0.075. Flood plain values ranged from 0.050 to 0.100.

Flood profiles were drawn showing computed water-surface elevations to an accuracy of 0.5 foot for floods of the selected recurrence intervals (Exhibit 1).

The starting water-surface elevations for Meadow Valley Wash were obtained by the slope-area method. Starting water-surface elevations for tributaries to Meadow Valley Wash were determined by critical-depth, slope-area, or backwater calculations.

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used in this study are shown on the maps.

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

The NFIP encourages State and local governments to adopt sound flood plain management programs. Therefore, each Flood Insurance Study produces maps designed to assist communities in developing flood plain management measures.

4.1 Flood Boundaries

To provide a national standard without regional discrimination, the 1 percent annual chance (100-year) flood has been adopted by FEMA as the base flood for flood plain management purposes. The 0.2 percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community. For each stream studied in detail, the 100- and 500-year flood plain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:4,800, with a contour interval of 5 feet (Reference 13).

The approximate flood plain boundaries were delineated using topographic maps at a scale of 1:4,800, with a contour interval of 5 feet (Reference 13).

The 100- and 500-year flood plain boundaries are shown on the Flood Boundary and Floodway Map (Exhibit 2). In cases where the 100- and 500-year flood plain boundaries are close together, only the 100-year flood plain boundary has been shown. Small areas within the flood plain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

4.2 Floodways

Encroachment on flood plains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of flood plain management involves balancing the economic gain from flood plain development against the resulting increase in flood hazard. For purposes of the NFIP, a floodway is used as a tool to assist local communities in this aspect of flood plain management. Under this concept, the area of the 100-year flood plain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent flood plain areas, that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Minimum Federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this study are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway studies.

The floodways presented in this study were computed on the basis of equal conveyance reduction from each side of the flood plain. The results of these computations are tabulated at selected cross sections for each stream segment for which a floodway is computed (Table 2).

A floodway was not computed for Antelope Canyon Wash due to high mean flow velocities. It was assumed that any encroachment for a floodway would create flow velocities having a high potential for scouring and erosion. Therefore, the 100-year flood plain boundary was adopted as the floodway boundary.

As shown on the Flood Boundary and Floodway Map (Exhibit 2), the floodway boundaries were computed at cross sections. Between cross sections, the boundaries were interpolated. In cases where the floodway and 100-year flood plain boundaries are either close together or collinear, only the floodway boundary has been shown.

The area between the floodway and 100-year flood plain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the flood plain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood by more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to flood plain development are shown in Figure 2.

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE
Meadow Valley Wash								
A	50[1]	170/140[2]	1,637	8.0	4,357.9	4,357.9	4,357.9	0.0
B	1,280[1]	147	1,658	7.9	4,363.5	4,363.5	4,364.0	0.5
C	1,370[1]	140	1,323	9.9	4,364.0	4,364.0	4,364.4	0.4
D	2,250[1]	87	1,001	13.1	4,372.0	4,372.0	4,372.0	0.0
E	2,990[1]	240	1,757	7.4	4,377.9	4,377.9	4,378.0	0.1
F	3,935[1]	99	1,248	10.5	4,381.6	4,381.6	4,382.0	0.4
G	4,855[1]	159	1,323	9.9	4,388.2	4,388.2	4,388.3	0.1
H	6,035[1]	240	1,968	6.7	4,394.3	4,394.3	4,394.7	0.4
I	7,675[1]	114	1,592	8.2	4,400.0	4,400.0	4,400.3	0.3
J	8,195[1]	62	626	18.8	4,402.4	4,402.4	4,402.4	0.0
Dry Wash Runoff								
A	600[3]	50[4]	855	1.1	4,369.7	4,369.7	4,369.7	0.0
B	1,430[3]	164/134[2]	531	1.8	4,369.7	4,369.7	4,369.8	0.1
C	2,130[3]	236	605	1.6	4,370.1	4,370.1	4,370.9	0.8
D	3,070[3]	65	212	4.6	4,372.7	4,372.7	4,373.6	0.9
E	3,900[3]	233	454	2.1	4,377.9	4,377.9	4,378.9	1.0
F	4,730[3]	62	158	6.1	4,384.1	4,384.1	4,384.9	0.8
G	5,560[3]	109	360	2.7	4,390.0	4,390.0	4,391.0	1.0

[1]Feet Above Corporate Limits [2]Width/Width Within Corporate Limits [3]Feet Above Mouth [4]Floodway Lies Entirely Outside Corporate Limits

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF CALIENTE, NV
(LINCOLN CO.)

FLOODWAY DATA

MEADOW VALLEY WASH-DRY WASH RUNOFF

TABLE 2

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE
Clover Creek								
A	100	121	831	6.9	4,401.3	4,393.4[2]	4,394.3[2]	0.9
B	1,550	365	3,591	1.6	4,406.5	4,406.5	4,407.1	0.6
C	2,900	206	716	8.0	4,408.3	4,408.3	4,409.0	0.7
D	3,610	176/46[3]	868	6.6	4,414.9	4,414.9	4,415.3	0.4
Antelope Canyon Wash								
A	840	294	583	12.3	4,429.7	4,429.7	4,429.7	0.0
B	1,540	253	541	11.9	4,441.1	4,441.1	4,441.1	0.0

[1]Feet Above Mouth [2]Elevation Computed Without Consideration of Backwater From Meadow Valley Wash
[2]Width/Width Within Corporate Limits

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(LINCOLN CO.)

FLOODWAY DATA

CLOVER CREEK-ANTELOPE CANYON WASH

TABLE 2

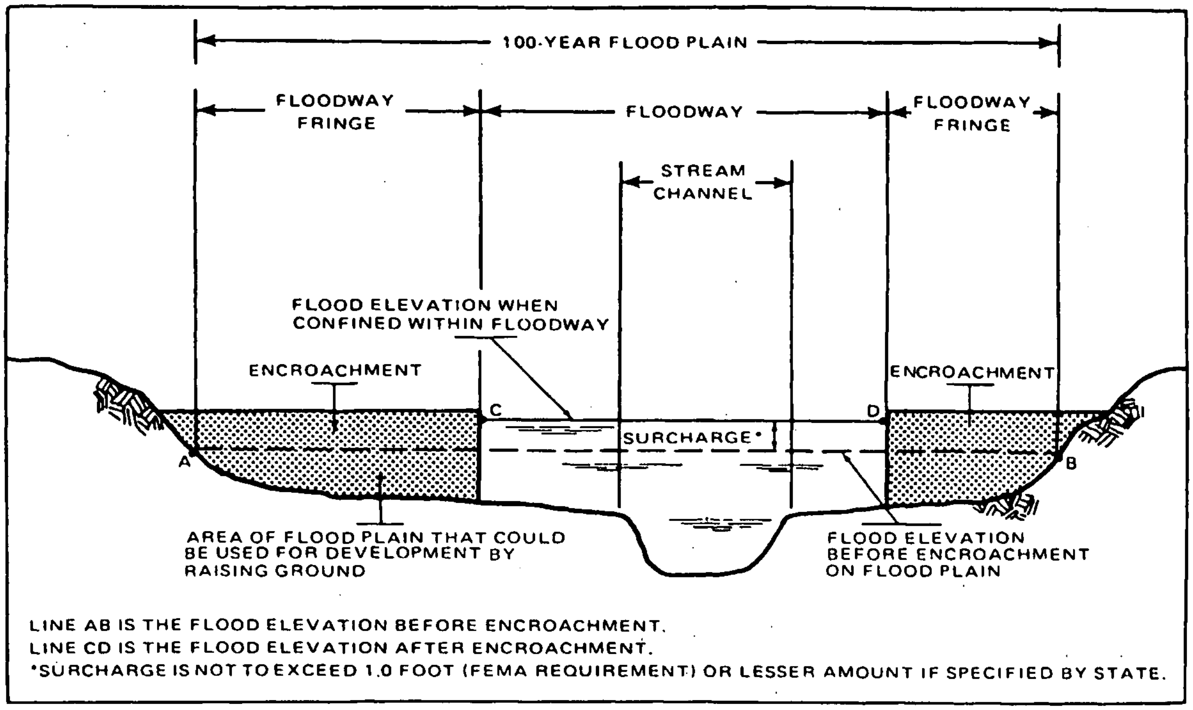

Figure 2. Floodway Schematic

5.0 INSURANCE APPLICATION

To establish actuarial insurance rates, data from the engineering study must be transformed into flood insurance criteria. This process includes the determination of reaches, Flood Hazard Factors, and flood insurance zone designations for each flooding source studied in detail affecting the City of Caliente.

5.1 Reach Determinations

Reaches are defined as sections of flood plain that have relatively the same flood hazard, based on the average weighted difference in water-surface elevations between the 10- and 100-year floods. This difference may not have a variation greater than that indicated in the following table for more than 20 percent of the reach:

Average Difference Between 10- and 100-Year Floods	Variation
Less than 2 feet	0.5 foot
2 to 7 feet	1.0 foot
7.1 to 12 feet	2.0 feet
More than 12 feet	3.0 feet

The locations of the reaches determined for the flooding sources of Caliente are shown on the Flood Profiles (Exhibit 1) and summarized in Table 3.

5.2 Flood Hazard Factors

The Flood Hazard Factor (FHF) is used to establish relationships between depth and frequency of flooding in any reach. This relationship is then used with depth-damage relationships for various classes of structures to establish actuarial insurance rate tables.

The FHF for a reach is the average weighted difference between the 10- and 100-year flood water-surface elevations rounded to the nearest one-half foot, multiplied by 10, and shown as a three-digit code. For example, if the difference between water-surface elevations of the 10- and 100-year floods is 0.7 foot, the FHF is 005; if the difference is 1.4 feet, the FHF is 015; if the difference is 5.0 feet, the FHF is 050. When the difference between the 10- and 100-year flood water-surface elevations is greater than 10.0 feet, it is rounded to the nearest whole foot.

5.3 Flood Insurance Zones

Flood insurance zones and zone numbers are assigned based on the type of flood hazard and the FHF, respectively. A unique zone number is associated with each possible FHF, and varies from 1 for a FHF of 005 to a maximum of 30 for a FHF of 200 or greater.

Zone A:	Special Flood Hazard Areas inundated by the 100-year flood, determined by approximate methods; no base flood elevations shown or FHFs determined.
Zone A0:	Special Flood Hazard Areas inundated by types of 100-year shallow flooding where depths are between 1.0 and 3.0 feet; depths are shown, but no FHFs are determined.
Zones A2, A3, A7, A12, A16, and A18:	Special Flood Hazard Areas inundated by the 100-year flood; with base flood elevations shown, and zones subdivided according to FHFs.
Zone B:	Areas between the Special Flood Hazard Areas and the limits of the 500-year flood; areas that are protected from the 100- or 500-year floods by dike, levee, or other local water-control structure; areas subject to certain types of 100-year shallow flooding where

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1% (100-YEAR) FLOOD AND			FLOOD HAZARD FACTOR	ZONE	BASE FLOOD ELEVATION[3] (FEET NGVD)
		10% (10-YEAR)	2% (50-YEAR)	0.2% (500-YEAR)			
Meadow Valley Wash							
Reach 1	0001	-8.1	-2.4	4.3	080	A16	Varies - See Map
Dry Wash Runoff							
Reach 1	0001	-6.0	-0.3	0.5	060	A12	4370
Reach 2	0001	-3.6	-0.3	0.5	035	A7	4370
Reach 3	0001	-0.8	-0.1	0.4	010	A2	Varies - See Map
Clover Creek							
Reach 1	0001	-9.1	-1.3	1.1	090	A18	Varies - See Map
Reach 2	0001	-1.6	-0.5	0.7	015	A3	Varies - See Map
Antelope Canyon Wash							
Reach 1	0001	-1.7	-0.5	0.5	015	A3	Varies - See Map
Shallow Flooding	0001	N/A	N/A	N/A	N/A	A0	Depth 2
Shallow Flooding	0001	N/A	N/A	N/A	N/A	A0	Depth 3

[1] Flood Insurance Rate Map Panel [2] Weighted Average [3] Rounded to Nearest Foot

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF CALIENTE, NV
(LINCOLN CO.)

FLOOD INSURANCE ZONE DATA

MEADOW VALLEY WASH-DRY WASH RUNOFF-CLOVER CREEK-ANTELOPE CANYON WASH-SHALLOW FLOODING

TABLE 3

depths are less than 1.0 foot; and areas subject to 100-year flooding from sources with drainage areas less than 1 square mile. Zone B is not subdivided.

Zone C: Areas of minimal flood hazard; not subdivided.

The flood elevation differences, FHFs, flood insurance zones, and base flood elevations for each flooding source studied in detail in the community are summarized in Table 3.

5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map for Caliente is, for insurance purposes, the principal product of the Flood Insurance Study. This map contains the official delineation of flood insurance zones and base flood elevations. Base flood elevation lines show the locations of the expected whole-foot water-surface elevation of the base (100-year) flood. The base flood elevations and zone numbers are used by insurance agents, in conjunction with structure elevations and characteristics, to assign actuarial insurance rates to structures and contents insured under the NFIP.

6.0 OTHER STUDIES

No other studies concerning water-surface elevations for the streams studied by detailed methods in Caliente were found.

A Flood Insurance Study has been published for the unincorporated areas of Lincoln County, Nevada (Reference 14). This study is in complete agreement with the Lincoln County study.

Because a more detailed approach to analyze flooding was used in this study, it supersedes the Flood Hazard Boundary Map published for Caliente (Reference 15).

7.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this study can be obtained by contacting the Natural and Technological Hazards Division, FEMA, Building 105, Presidio of San Francisco, San Francisco, California 94129.

8.0 BIBLIOGRAPHY AND REFERENCES

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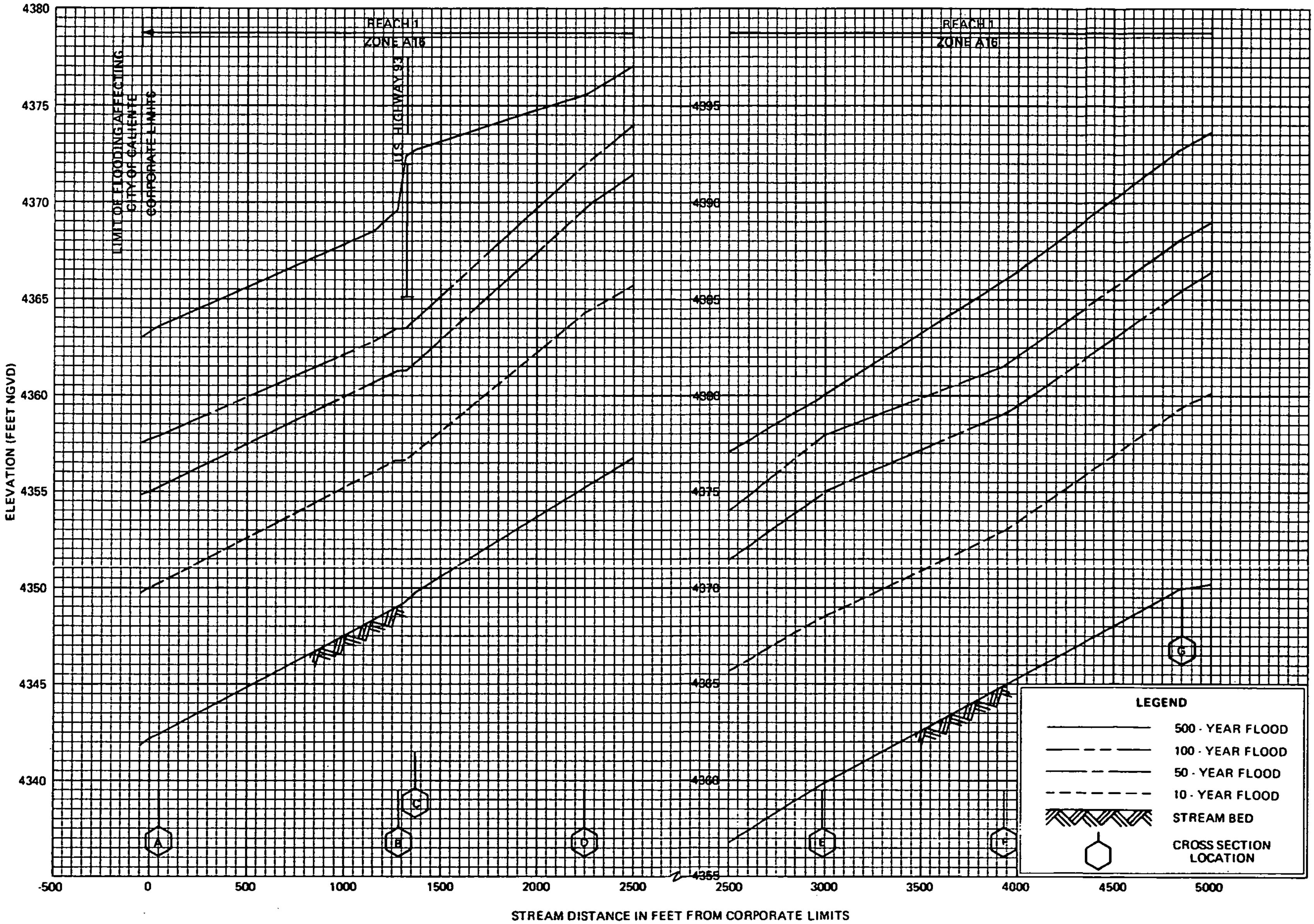


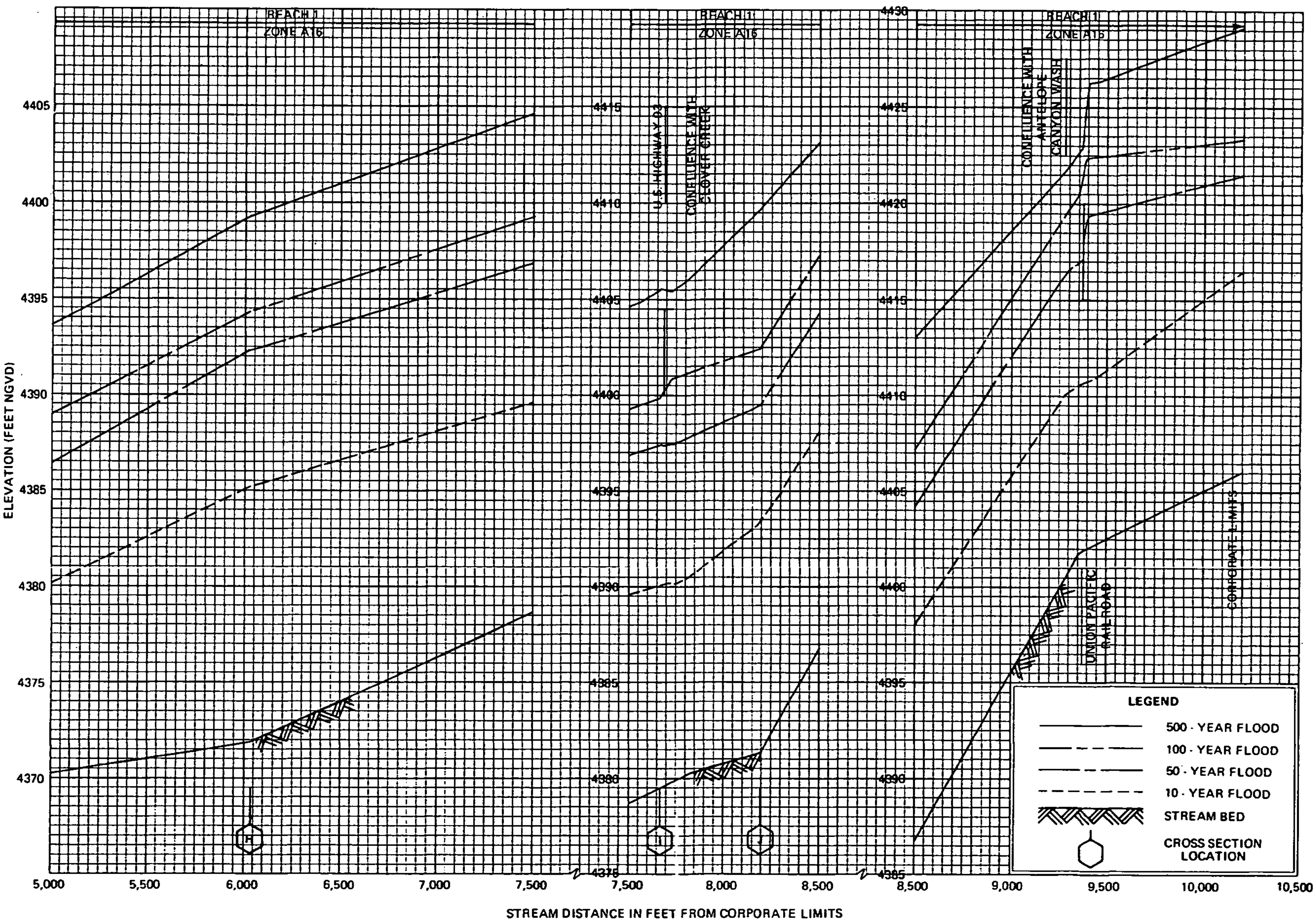
FLOOD PROFILES

MEADOW VALLEY WASH

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF CALIENTE, NV
(LINCOLN CO.)

01P



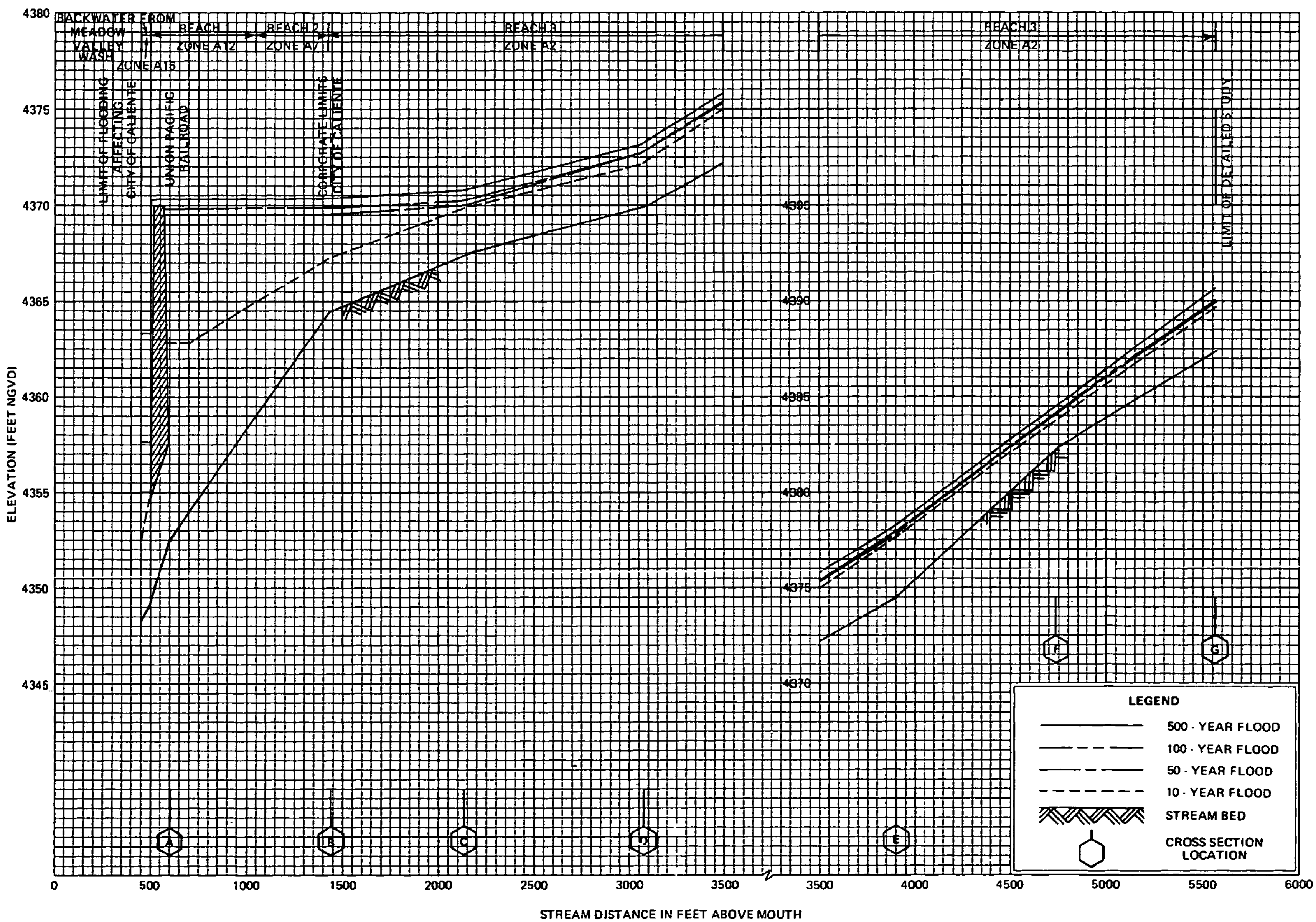
FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF CALIENTE, NV
(LINCOLN CO.)

FLOOD PROFILES

MEADOW VALLEY WASH

02P



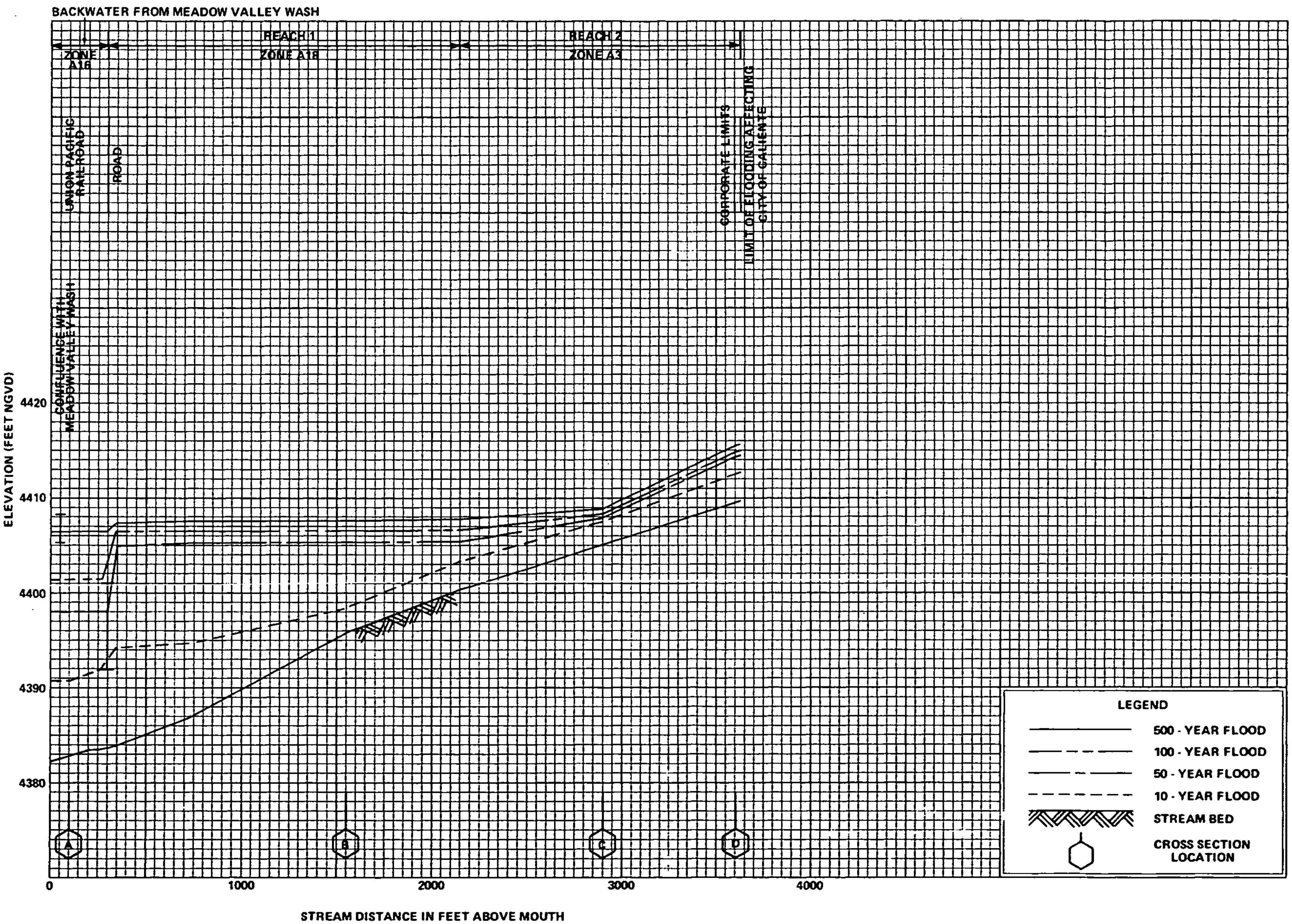
FLOOD PROFILES

DRY WASH RUNOFF

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF CALIENTE, NV
(LINCOLN CO.)

03P



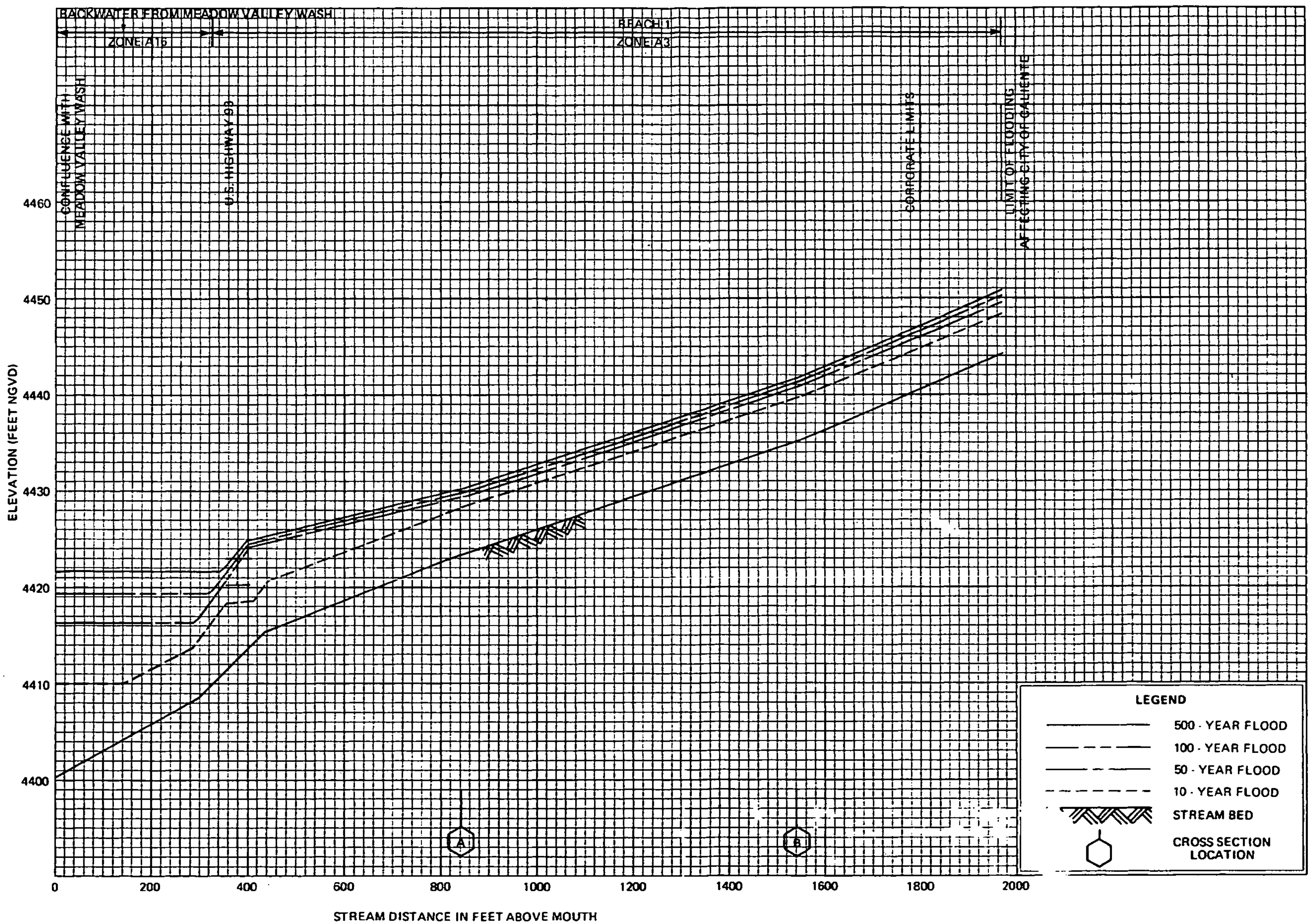
FLOOD PROFILES

CLOVER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF CALIENTE, NV
(LINCOLN CO.)

04P



FLOOD PROFILES

ANTELOPE CANYON WASH

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF CALIENTE, NV
(LINCOLN CO.)

05P